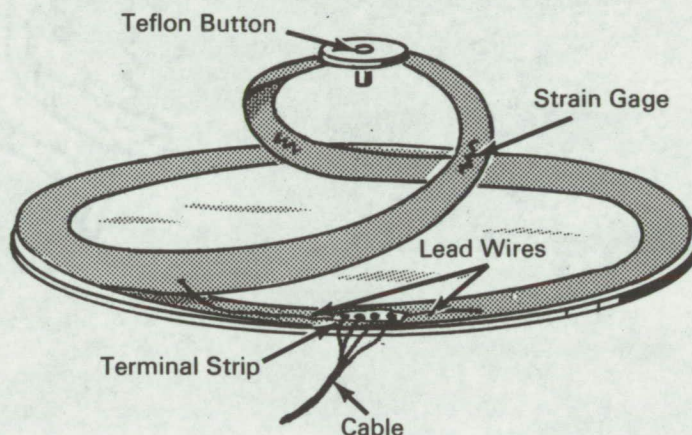


NASA TECH BRIEF



NASA Tech Briefs are issued to summarize specific innovations derived from the U. S. space program and to encourage their commercial application. Copies are available to the public from the Clearinghouse for Federal Scientific and Technical Information, Springfield, Virginia 22151.

Spiral Spring/Strain Gage Combination Accurately Measures Shock Induced Deflection



The problem:

To measure deflection between two relatively inaccessible surfaces in a drop test that causes them to close to near flatness. Prior methods used nonresilient blocks whose depth was measured before and after impact, but too many variables entered deflection calculations and no permanent record could be made at moment of impact.

The solution:

A spiral spring (or springs) equipped with strain gages hard-wired to readout instrumentation.

How it's done:

Two strain gages are fastened to each spiral spring in such a way that deflection of the spring causes equivalent deflection of the gages. A constant dc voltage is fed to the two gages, whose output is indicated on appropriate instruments, including a strip chart recorder. In a drop test, impact causes the

springs to be compressed, thus deflecting the strain gages and changing their electrical resistance relative to the amount of deflection. The resultant change in strain gage dc output is simultaneously indicated on a voltmeter and recorded permanently on the strip chart.

Notes:

1. This technique has been successfully used on Apollo drop tests to measure deflection between aft bulkhead and heatshield.
2. This could be of value in industrial testing for manufacturing requiring precise gap measurement in inaccessible areas.
3. Inquiries concerning this invention may be directed to:

Technology Utilization Officer
Manned Spacecraft Center
Houston, Texas 77058
Reference: B66-10488

(continued overleaf)

Patent status:

Inquiries about obtaining rights for the commercial use of this invention may be made to NASA, Code GP, Washington, D.C. 20546.

Source: R. R. Walker and B. R. Berven
of North American Aviation, Inc.
under contract to
Manned Spacecraft Center
(MSC-789)